

# **Skill and Knowledge Limitations in Marine Casualties**

## **Investigation and Reporting Procedures**



**Marine Safety Offices  
1998-1999**

# Project Team

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## **U.S. Coast Guard R & D Center**

- Anita Rothblum, Human Factors Research Scientist

## **Battelle**

- Marvin McCallum, Senior Research Leader
- Alice Forsythe, Research Associate

# Project Background

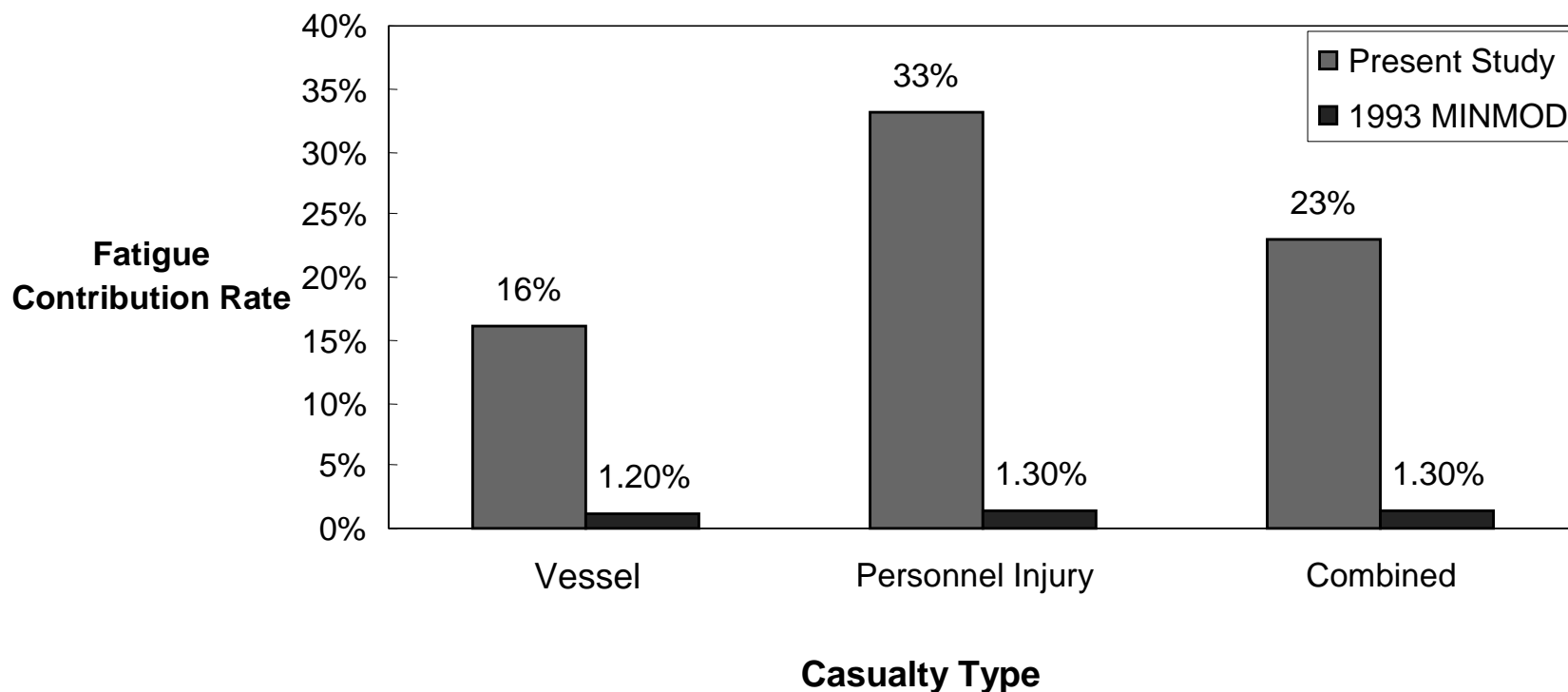
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- USCG has great potential for determining human factors' role in casualties
- USCG R&D fatigue investigation project (1995-96)
- USCG R & D communications investigation project (1997-98)

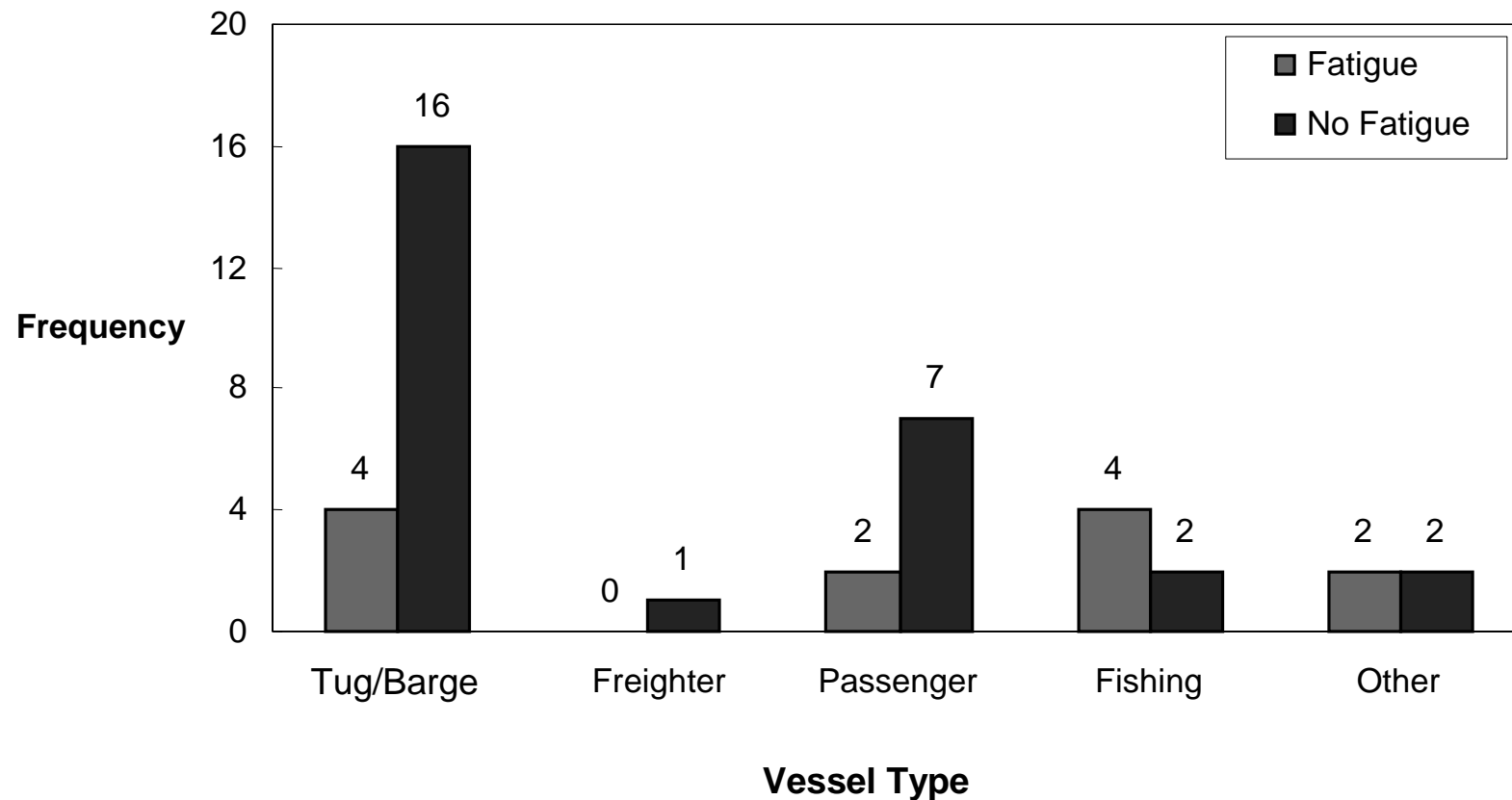
# Fatigue Study Results:

## Level of Fatigue Contribution

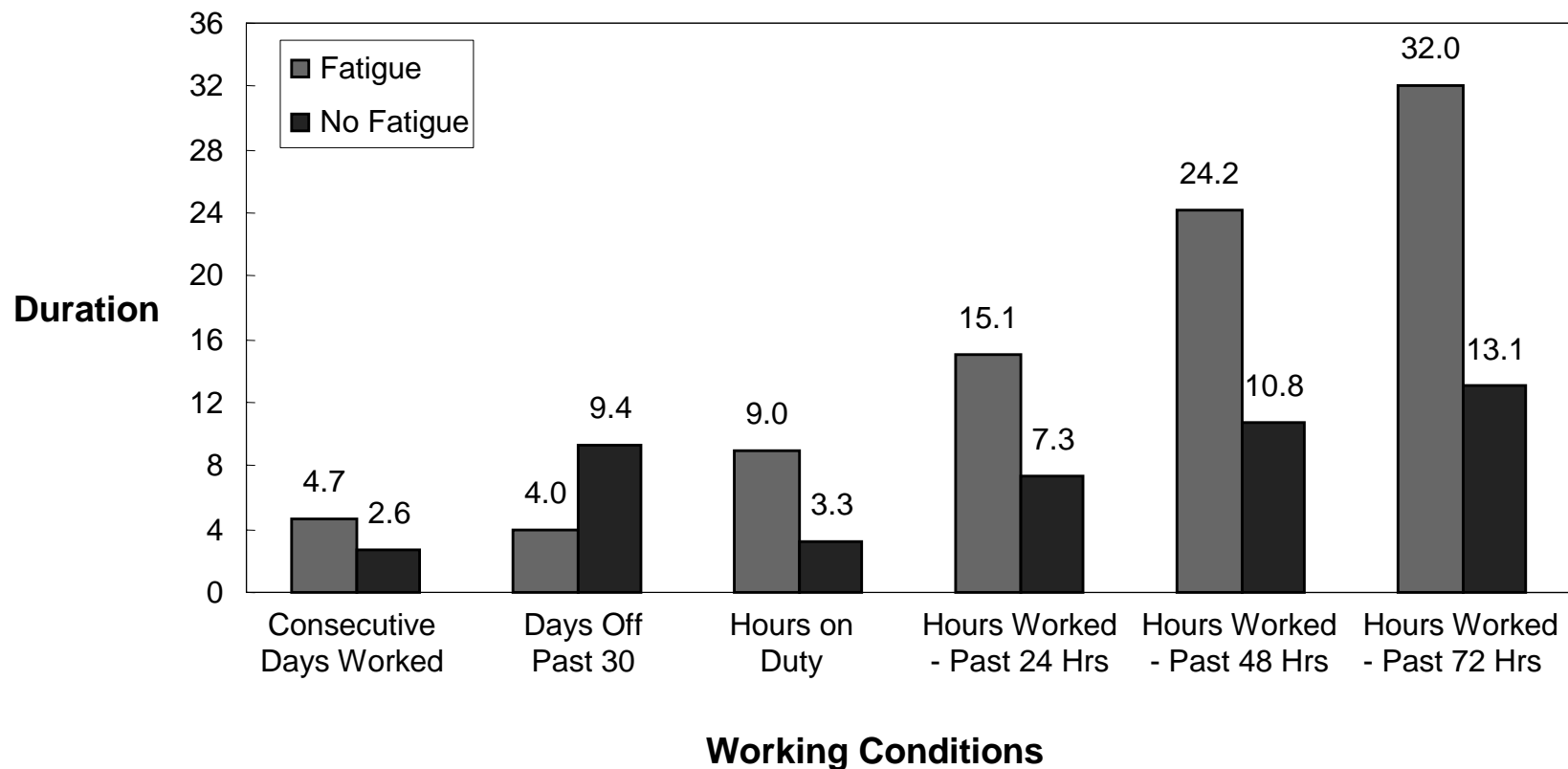
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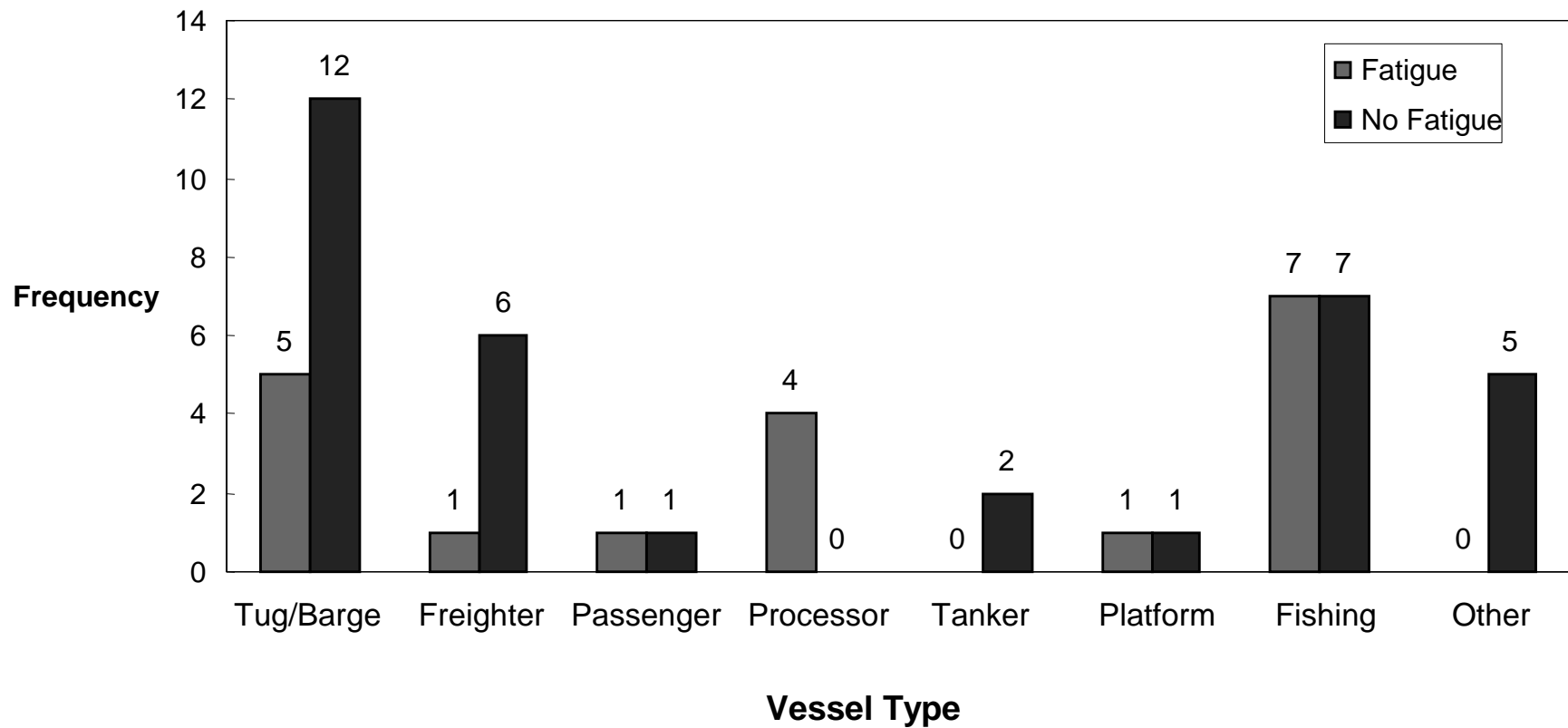
# Fatigue Study Results: Vessel Casualty Industry Segments



# Fatigue Study Results: Vessel Casualty Working Conditions

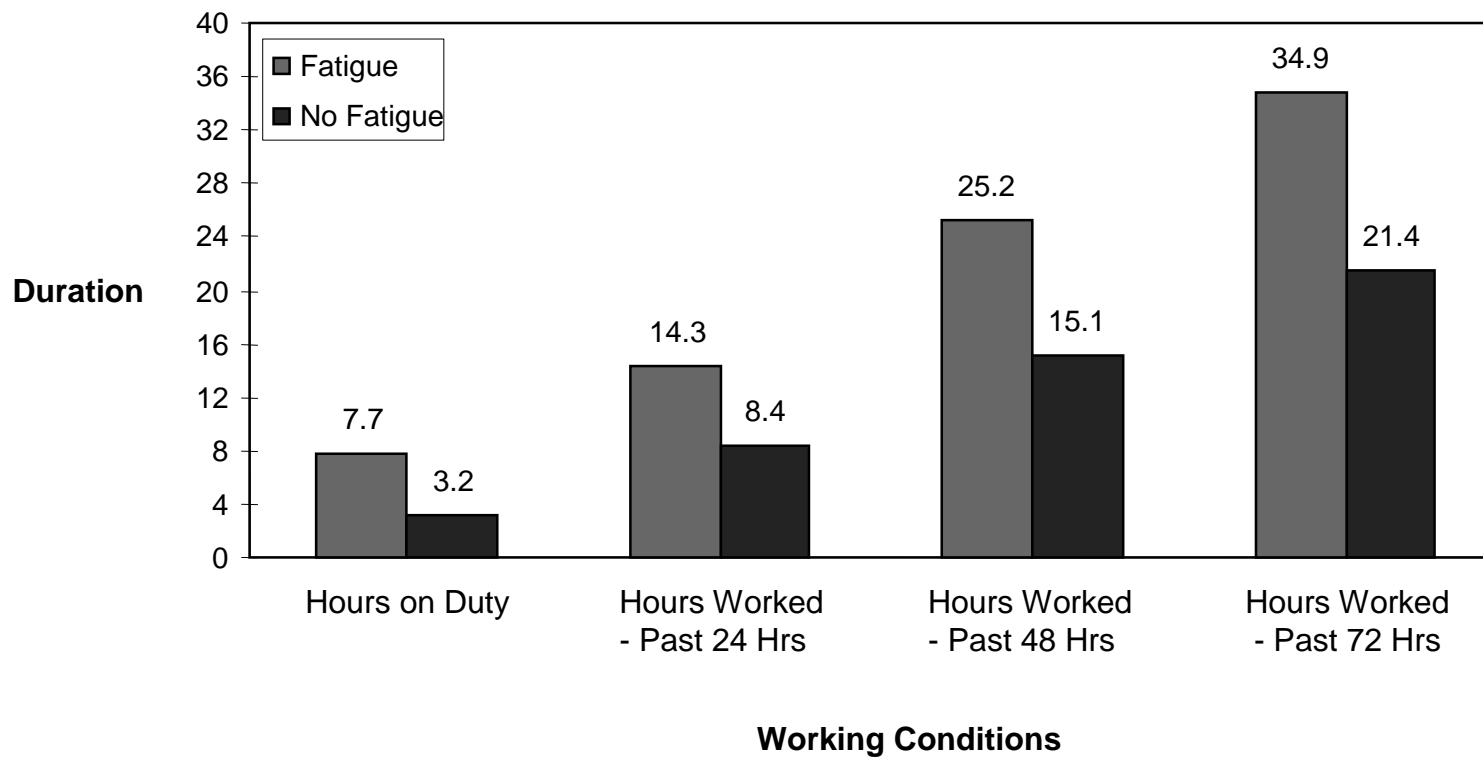


# Fatigue Study Result: Personnel Injury Industry Segments



# Fatigue Study Results: Personnel Injury Working Conditions

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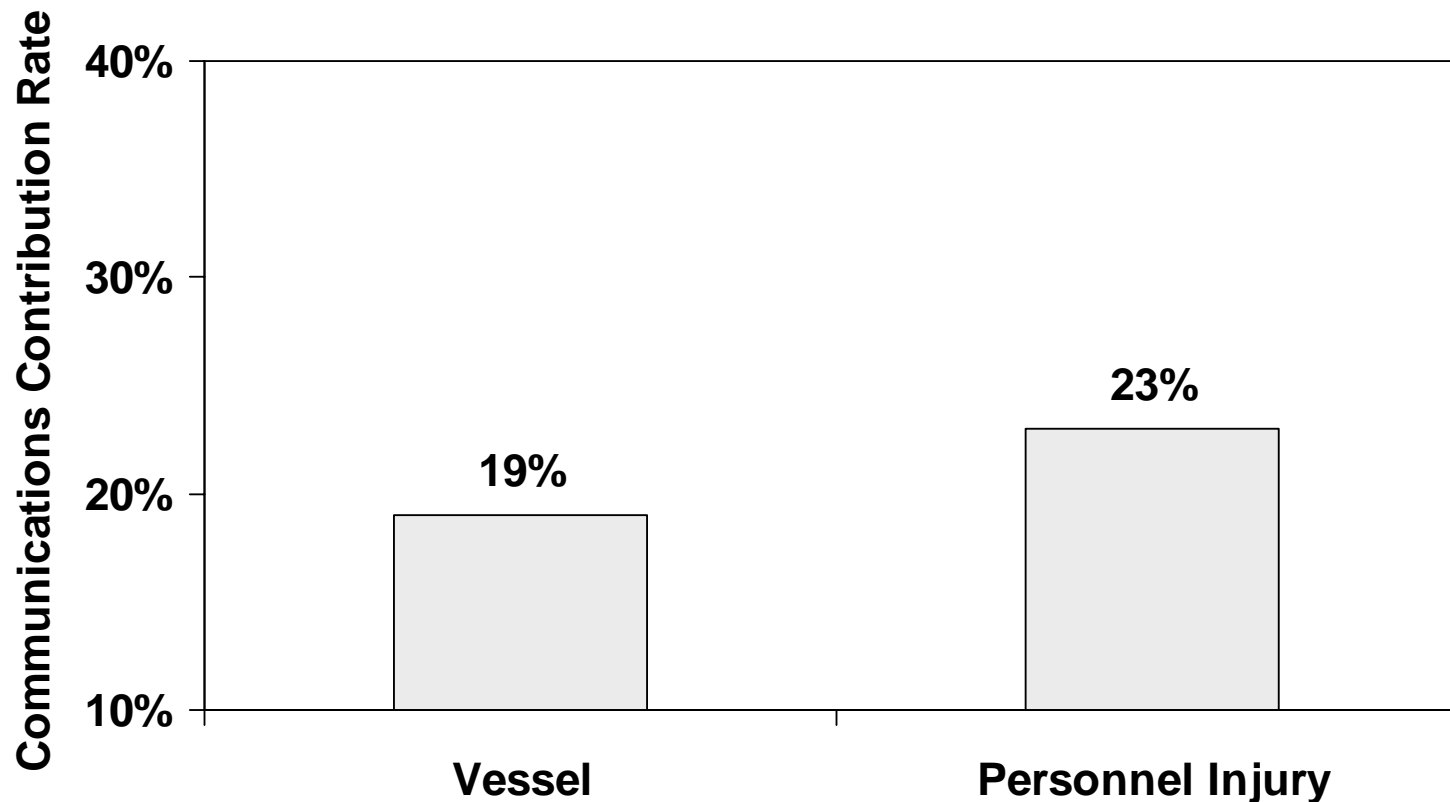




# Communications Study Results: Level of Communication Contribution

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Critical Casualties (not including loss of propulsion)

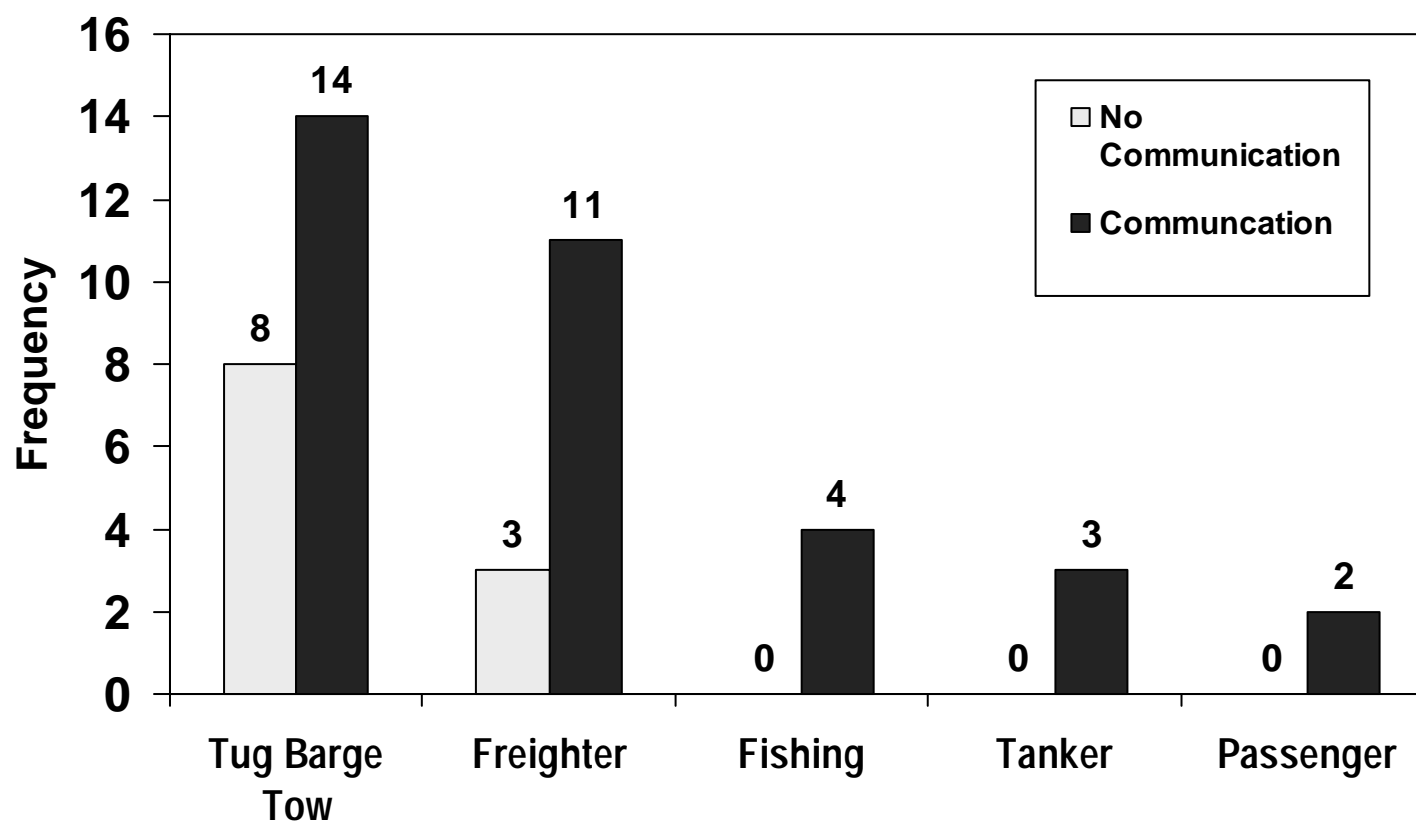


# Communications Study Results:

## Vessel Casualty Industry Segments in Cases with Communications Potential

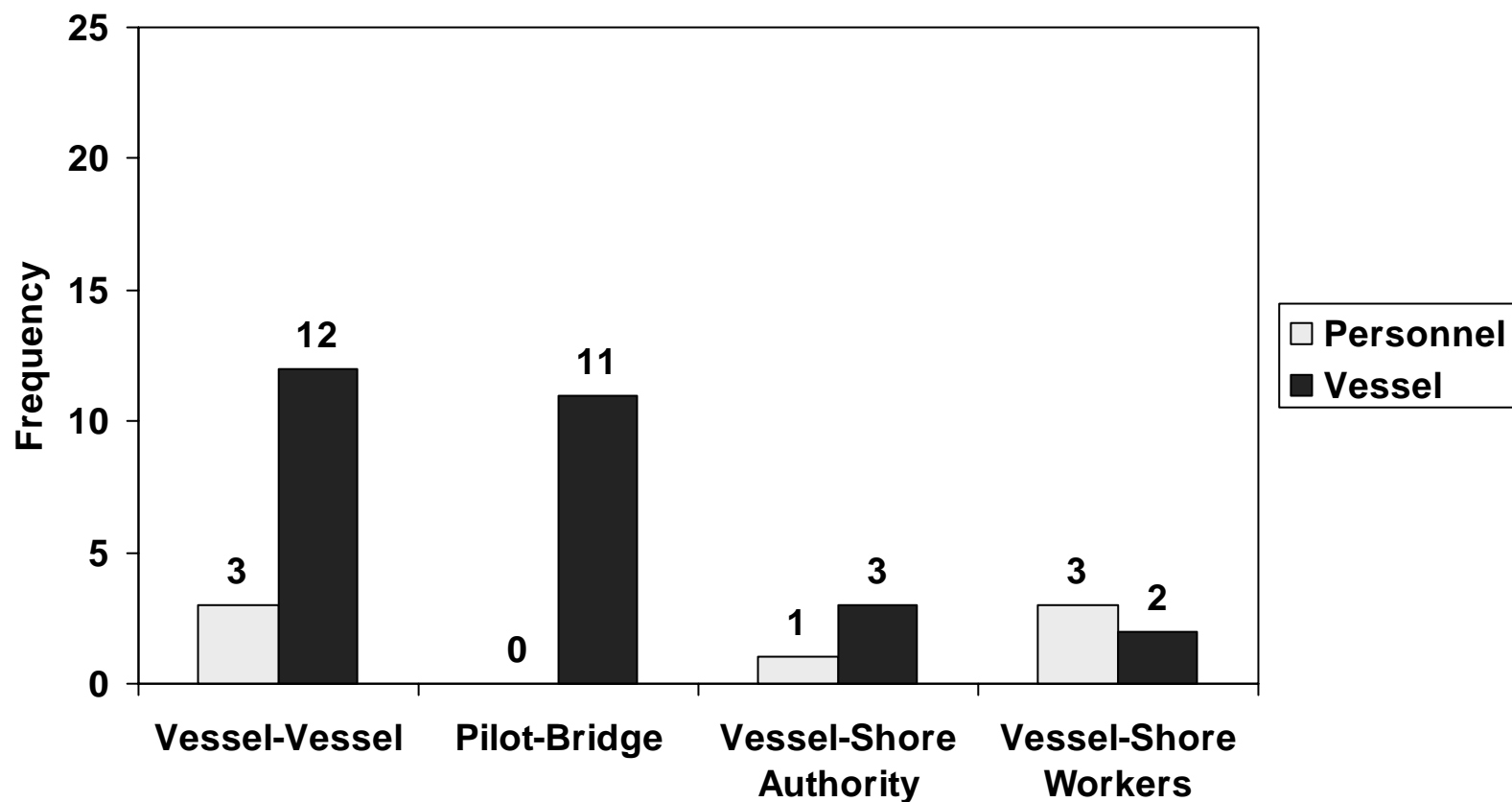
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- Human Factors Involvement
- Two or more people working together



# Communications Study Results: Type of Communications Involvement

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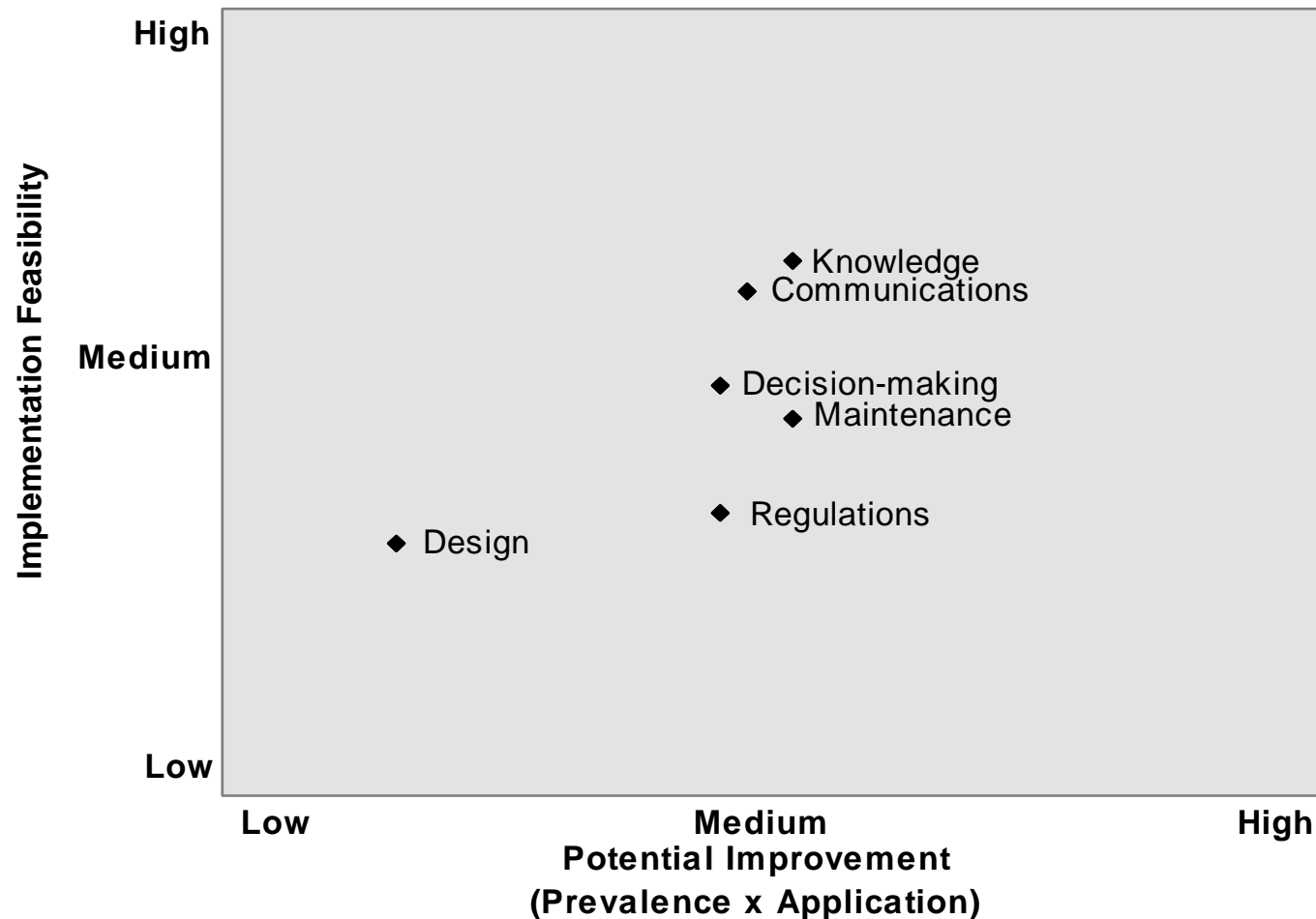


# Program Objectives

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1. Enhance investigation of *human factors* in marine casualties.
2. Develop and implement single human factor topic investigation and reporting procedures.
3. Evaluate procedures usability, value of data, and applicability of methods.
4. Support *Prevention Through People*.

# Result of Human Factors Topic Assessment



# **Skill & Knowledge Limitation Investigation Goals**

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- Determine skill & knowledge limitation contributions to marine casualties
- Identify trends in skill and knowledge limitations in maritime industry
- Increase maritime safety by identifying operational practices that contribute to skill and knowledge limitations and casualties

# Project Plan

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1. Develop investigation procedures and forms.
2. Train Investigators at selected MSOs.
3. Assess and modify procedures.
4. Continue investigation for 6-8 months.
5. Obtain final MSO feedback.
6. Analyze data and report findings.

# Project Overview

	1998									1999									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	
Procedure Development																			
Investigator Training																			
Casualty Investigation																			
Casualty Reporting																			
Procedure Assessment																			
Analysis & Reporting																			



# Today's Training Schedule

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- Morning
  - » Project background & training objectives
  - » Human factors & human error concepts
  - » Skill and knowledge concepts
  - » Investigation & reporting procedures
- Afternoon
  - » Case scenarios
  - » Wrap-up

# Training Objectives

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1. Develop general understanding of:
  - project goals
  - human factors concepts
  - human errors in casualties
  - mariner skill and knowledge limitations & contributing factors
2. Become familiar with investigation and reporting procedures for skill and knowledge limitations project

# What is Human Factors?

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A multi-disciplinary approach to the study of human abilities and limitations, and how characteristics of *machines* and the *environment* (physical, organizational) interact to affect *human* performance.

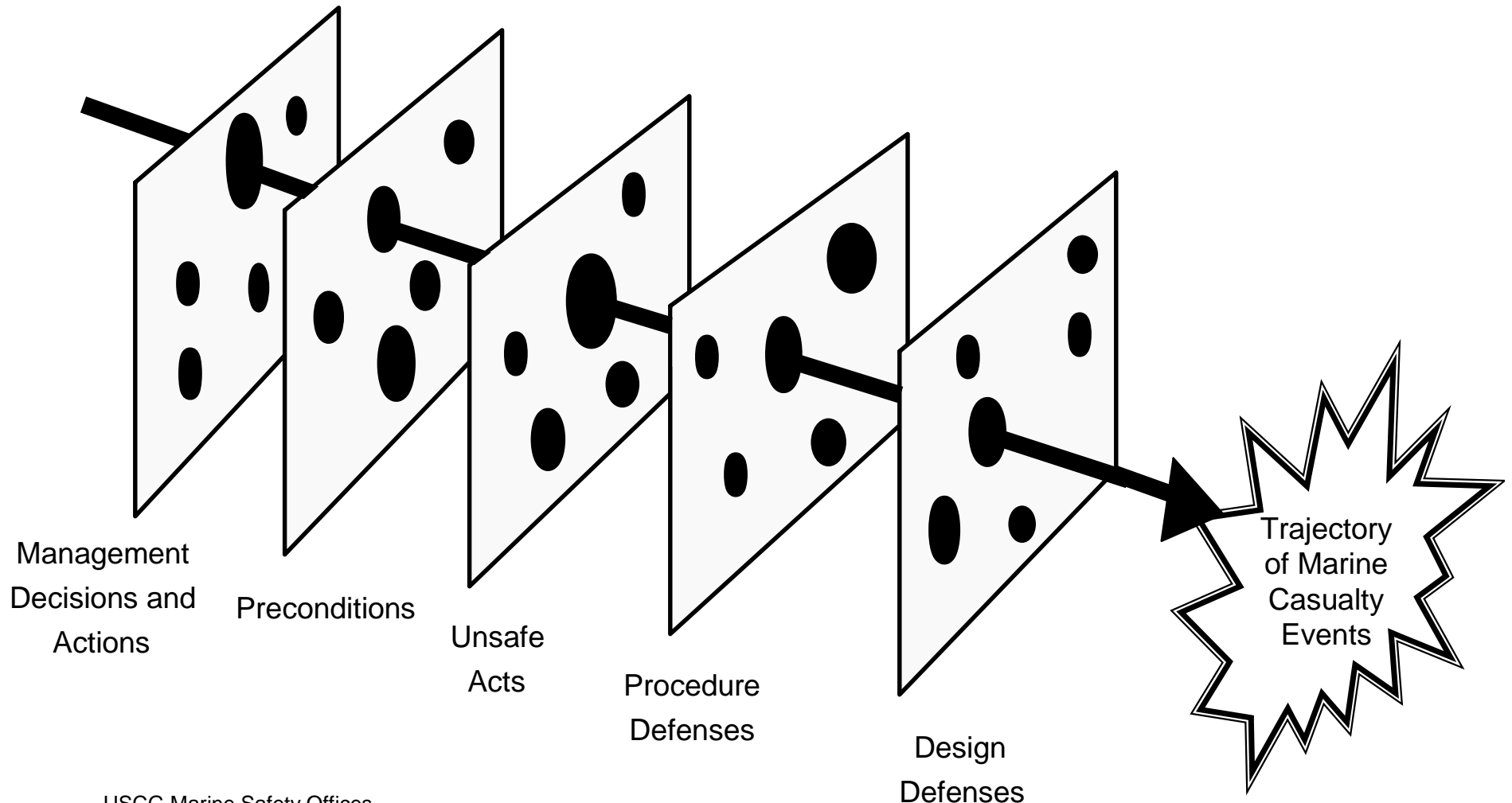
# Human Factors Perspective on Casualty Investigation

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Focuses on:

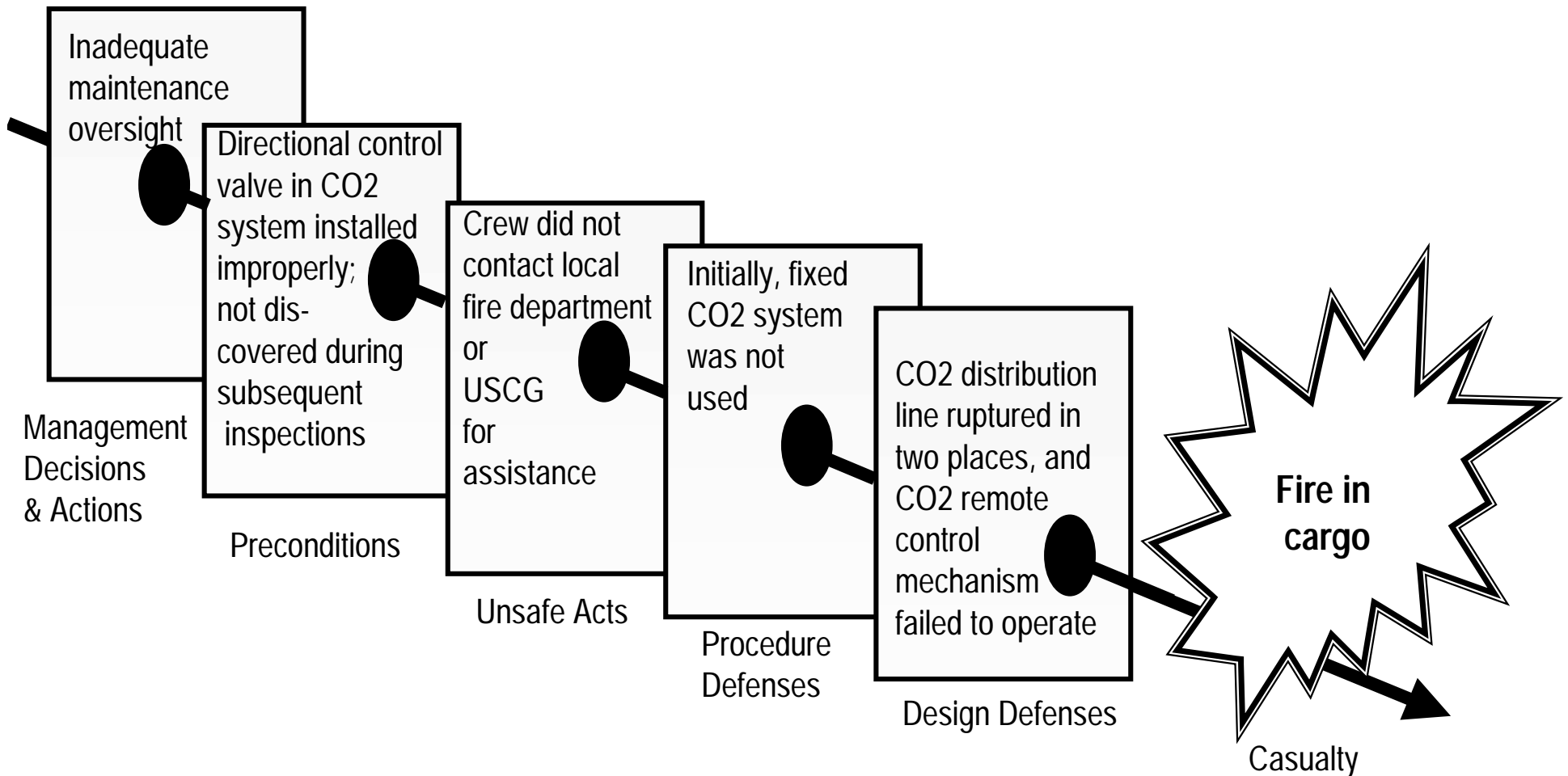
- Human capabilities and limitations
- Human performance in operating & maintaining equipment or system
- Operating conditions
- Environmental conditions

# Factors Contributing to Marine Casualties



# Skill & Knowledge Limitation Example

December 28, 1988 fire aboard cargo vessel on Galveston's Pier 39



# Unsafe Conditions - Unsafe Acts

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## ***Unsafe Conditions***

- inadequate guards or protection
- defective tools, equipment, substances
- congestion
- inadequate warning system
- fire and explosion hazards
- excessive noise
- inadequate lighting

## ***Unsafe Acts***

- acting without proper authority
- failure to warn or secure
- operating at improper speed
- using defective equipment
- using equipment improperly
- failure to use personal protective gear
- improper loading or lifting

# Unsafe Actions & Errors

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- In hindsight a human action or inaction is labeled an *error*.
- Errors are unplanned, unintentional, and represent inappropriate actions in a given set of circumstances.
- Contributing factors to errors and consequences of errors are the important factors to study.
- Only errors which have the greatest potential for reducing safety & system effectiveness, and factors contributing to these errors, should be investigated.



# Human Error Classifications

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## Commission Errors

inappropriate action

e.g., while fighting fire,  
crewmember turns the fuel pump  
to 'on' rather than 'off'

Omission Errors  
absence of a required action

e.g., while fighting fire,  
crewmember forgets to mention that  
fuel pump is 'on'



## Slip

correct intention,  
but inappropriate action

e.g., switched radar 'off'  
rather than 'on'

## Mistake

inappropriate intention

e.g., maintained full speed in  
narrow channel despite traffic

Reason (1990)

# How to Reduce Errors

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Human errors can be reduced by addressing:

1. Task design.....fewer mistakes
2. Equipment design..... fewer slips
3. Training..... fewer commission errors,  
omission errors, slips,  
and/or mistakes
4. Procedures & Aids..... fewer commission errors  
and/or omission errors
5. System design.....more error-tolerant

# Why Study *Skill & Knowledge Limitations*?

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- One of 10 critical human factors contributions to marine casualties identified by *Prevention Through People Quality Action Team*.
- Ranked # 1 priority in assessment of potential investigation topics.
- Lack of reliable data; estimates of contribution range from 4-35%.

# Prevalence of Skill & Knowledge Limitations in Marine Casualties

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- NTSB identifies 'KNOWLEDGE' as a contributing factor in 70 of 215 (32.6%) casualties
- Quinn & Scott (1982) states 'LACK OF KNOWLEDGE' contributed to 11 of 287 cases (4%) and 'EXPERIENCE' contributed to 22 of 287 cases (8%)
- Wagenaar & Groeneweg (1987) suggests 35% of the 100 accidents reviewed were due to 'TRAINING'
- Prevention Through People report states 'INADEQUATE TECHNICAL COMPETENCY' is the contributing factor most frequently cited in the literature

# What do we mean by *skill* and *knowledge limitation*?

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- The inability to meet job skill and knowledge demands



- » **Skill Limitations:** Mariner's performance of job activities does not meet job demands
- » **Knowledge Limitations:** Mariner's theoretical understanding or knowledge of rules and procedures does not meet job demands

# Some Job Requirements with Skill Demands

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- Determine type and aspect of other vessel
- Maneuver vessel in accordance with sea/river/weather conditions
- Load and lash cargo
- Operate pumping equipment
- Use fire fighting equipment
- Launch, load, and maneuver lifeboats

# Some Job Requirements with Knowledge Demands

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- Recognize and apply COLREGS
- Calculate course changes based on navigation information, local conditions, and local regulations
- Adjust ballast as required to maintain stability
- Handle dangerous and hazardous cargo
- Establish and maintain a fire safety plan
- Use medical chest and First Aid items

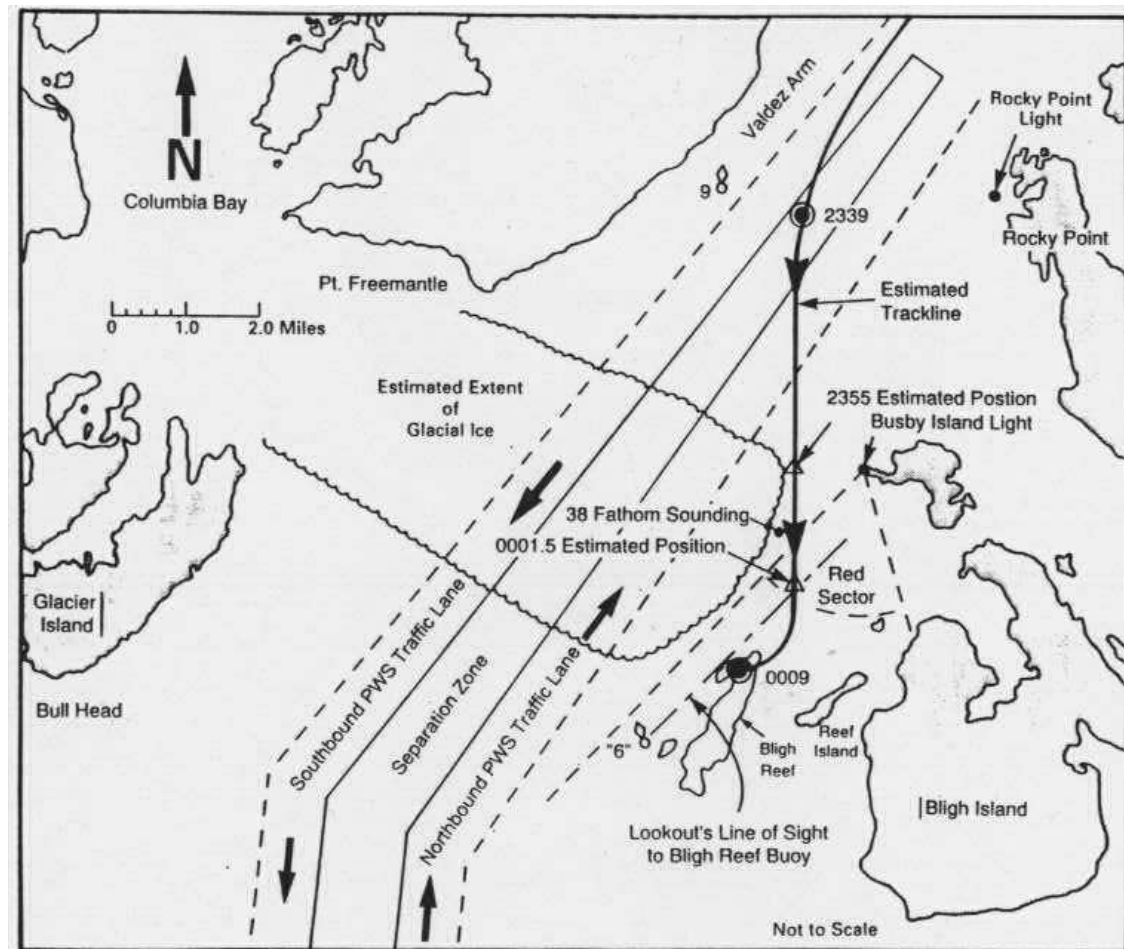
# Example of Knowledge Limitation : *Exxon Valdez* Grounding

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- Both 3rd mate and helmsman lacked knowledge of autopilot operations
  - » Steering wheel will not effect a course change when autopilot is on
  - » *Valdez* on autopilot when 3rd mate gave order for right 10° rudder
  - » Inexperienced helmsman turned wheel right 10°
  - » For 6 minutes, 3rd mate & helmsman failed to notice the course change had not been executed
  - » Fundamental mistake contributed to grounding



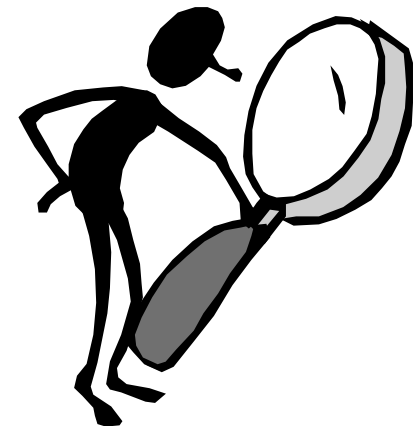
# Probable Track Line of *Exxon Valdez*



# Overview of Skill & Knowledge Limitation Investigations

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- Identify specific action(s) or inaction directly contributing to casualty
- Report on mariner's training and experience
- Augment investigation & reporting procedures



# Mariner Operations & Activities

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- Mariner operations / activities derived from:
  - » *STCW Code*
  - » *Tanker Navigation Safety Standards* (draft)
  - » *CFR 46 - Shipping*
  - » Tasks defined as part of *USCG Crew Size Evaluation Method* research
  - » Maritime Academy Simulator Committee's report on bridge watchkeeping for undergraduates
  - » Discussions with MSO Investigating Officers in New Orleans, New York, & Portland
  - » Discussions with selected maritime industry reps

# Mariner Operations & Activities

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List is divided into four major areas:



- Bridge Operations
- Deck Operations
- Engineering Operations
- Safety & Emergency Operations

# Bridge Operations

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- Changing Watch
- Visual Monitoring and Lookout
- Collision Avoidance
- Grounding Avoidance and Navigation
- Shiphandling
- Bridge Communications
- Port or Anchor Watch

# Deck Operations

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- Vessel Stability and Integrity Management
- Deck Equipment Operations
- Container Cargo Operations
- Bulk Cargo Operations
- Petroleum Cargo Operations
- Towing and Fleeting Operations
- Fishing Operations
- Deck Communications
- Deck Maintenance
- Passenger Safety

# Engineering Operations

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- Changing Watch
- Engineering Systems Operations
- Engineering Systems Inspection and Testing
- Routine, Scheduled, and Preventive Maintenance
- Unscheduled, Corrective Repair
- Engineering Communications

# Safety and Emergency Operations

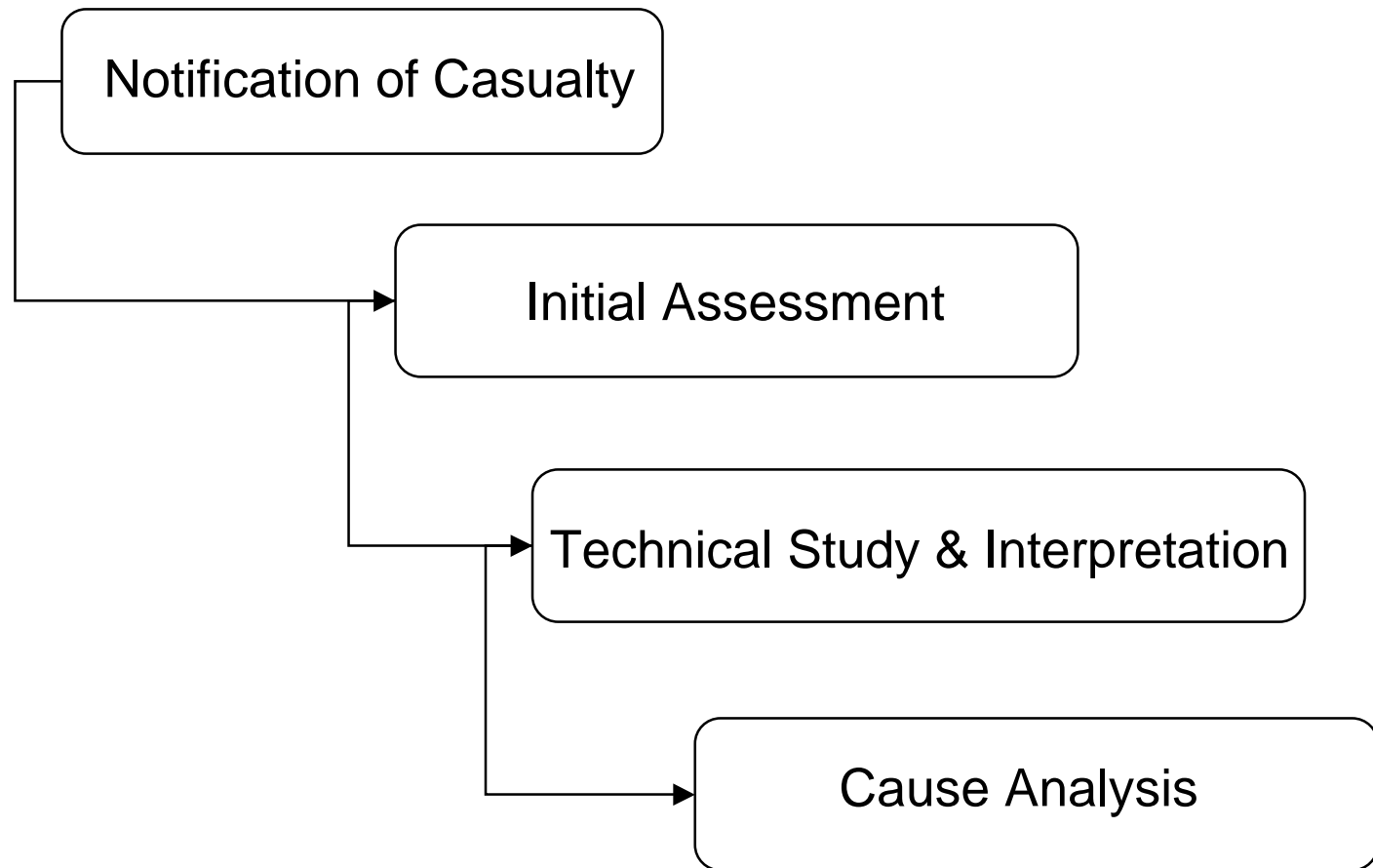
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- Safety Equipment Inspection and Service
- Controlling and Fighting Fires
- Confined Space Rescue
- Person Overboard Procedures
- Abandon Vessel Operations
- Emergency Medical and Lifesaving Procedures
- Emergency Communications



# General Investigation Process

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# Initial Assessment

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- Review facts (CG2692)
- Answer preliminary questions,
- Identify unsafe acts and conditions
- Evaluate potential severity and risk of recurrence

# Technical Study & Interpretation

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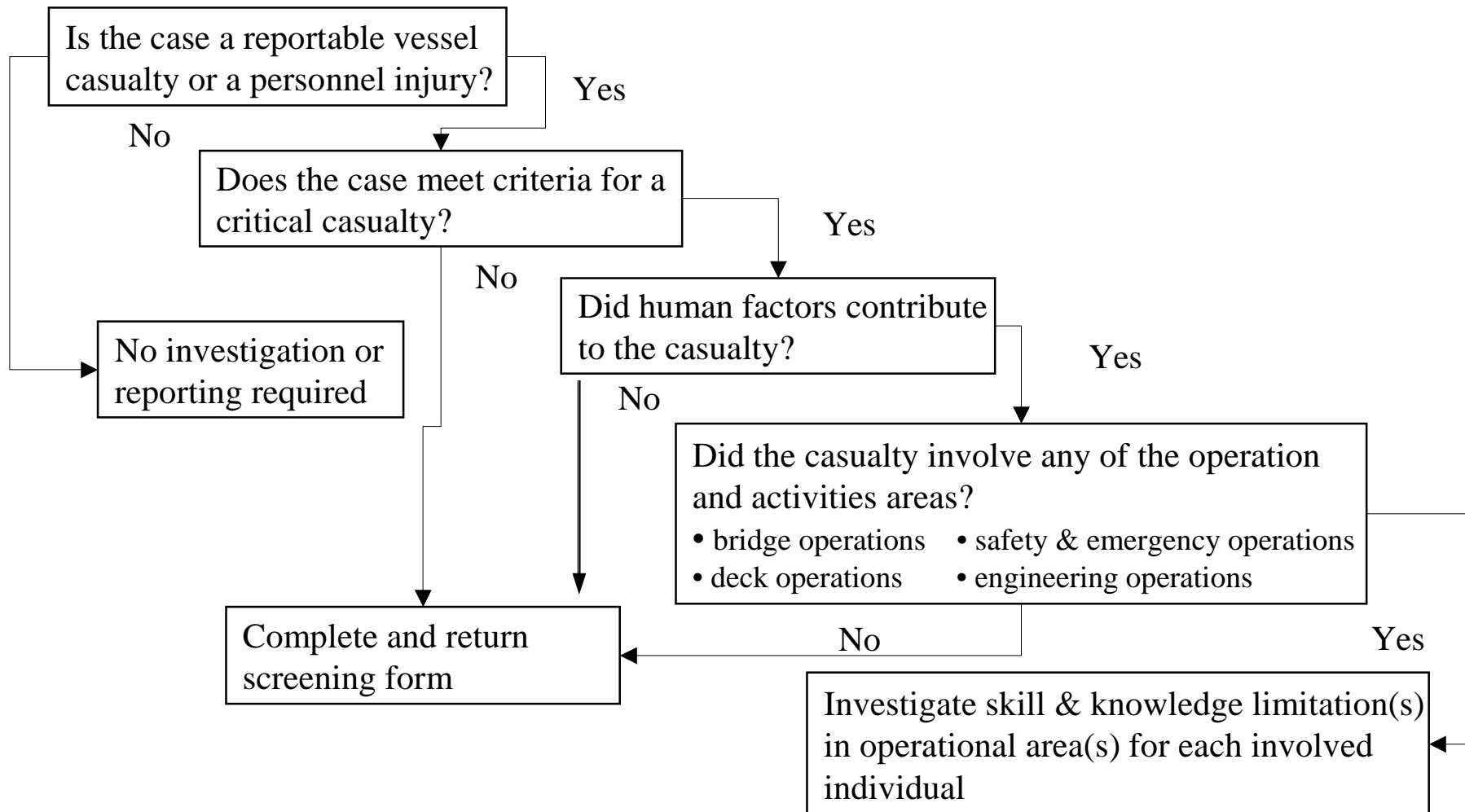
- Information not found or not readily discernible at the accident scene.
- Information contains clues to origins of unsafe actions and conditions.
- Information requires precise examination of personal and organizational factors.

# Cause Analysis

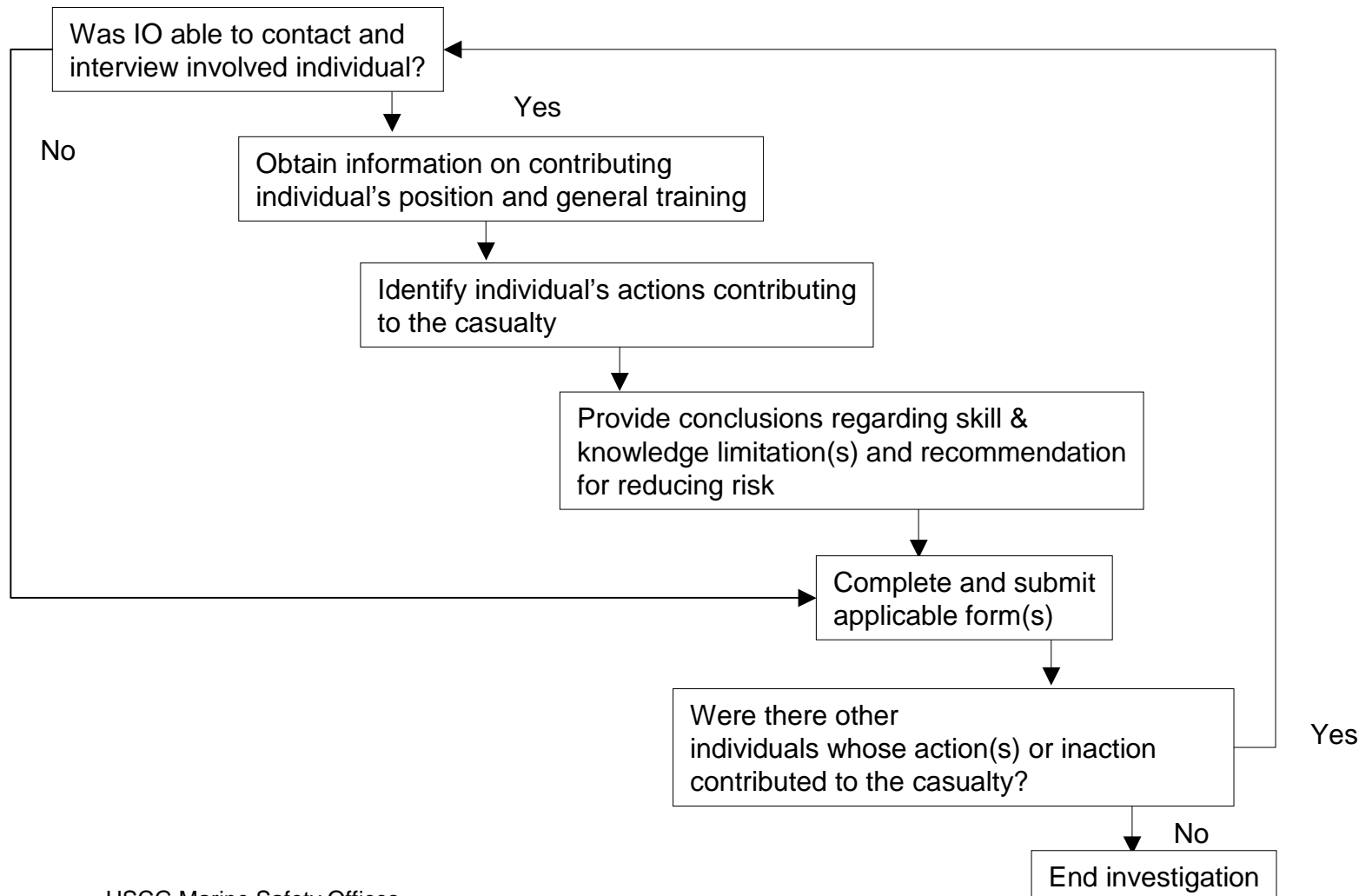
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- “Cause analysis traces the origins of the accidents to their roots in managerial errors and lack of controls”

# Overview of Screening Process



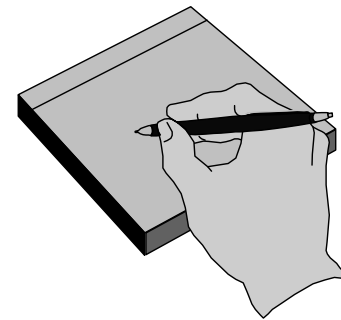
# Overview of Skill & Knowledge Operational Area Investigation & Reporting



# Data Collection Forms

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- *Casualty Screening & Background Form*
- *Four Operations Forms:*
  - » *Bridge*
  - » *Deck*
  - » *Engineering*
  - » *Safety & Emergency*



# Casualty Screening & Background Form

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- Reference information
- Criticality of casualty
- Human factors involvement
- Identification of involved skill & knowledge limitation operational area(s)
- Basic casualty information
- Individual(s) involved



# Casualty Screening & Background Form

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Insert blank form and explain its sections

# Operations Forms

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- Four different forms:
  - *Bridge, deck, engineering, safety & emergency*
- Fill out applicable form for each involved individual
- Content
  - Reference information
  - Individuals contacted
  - Training & experience of individual involved
  - Individual's specific activities contributing to casualty
  - Conclusions and recommendations

# Operations Forms

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Insert blank forms and use Bridge Operations Form as an example when explaining the five sections

# Three Example Cases

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- 1) *Aleutian Enterprise* - capsizing, sinking
  - » how skill & knowledge limitations can contribute to a casualty
  - » how skill & knowledge limitations were investigated
- 2) *Yorktown Clipper* - grounding
  - » identification of skill & knowledge limitations-related factors
  - » questions IOs should ask
- 3) *Scandinavian Star* - fire in engine room
  - » initial factual information given
  - » role play interview with crew member

# CASE 1: Sinking of Fishing Vessel in Bering Sea

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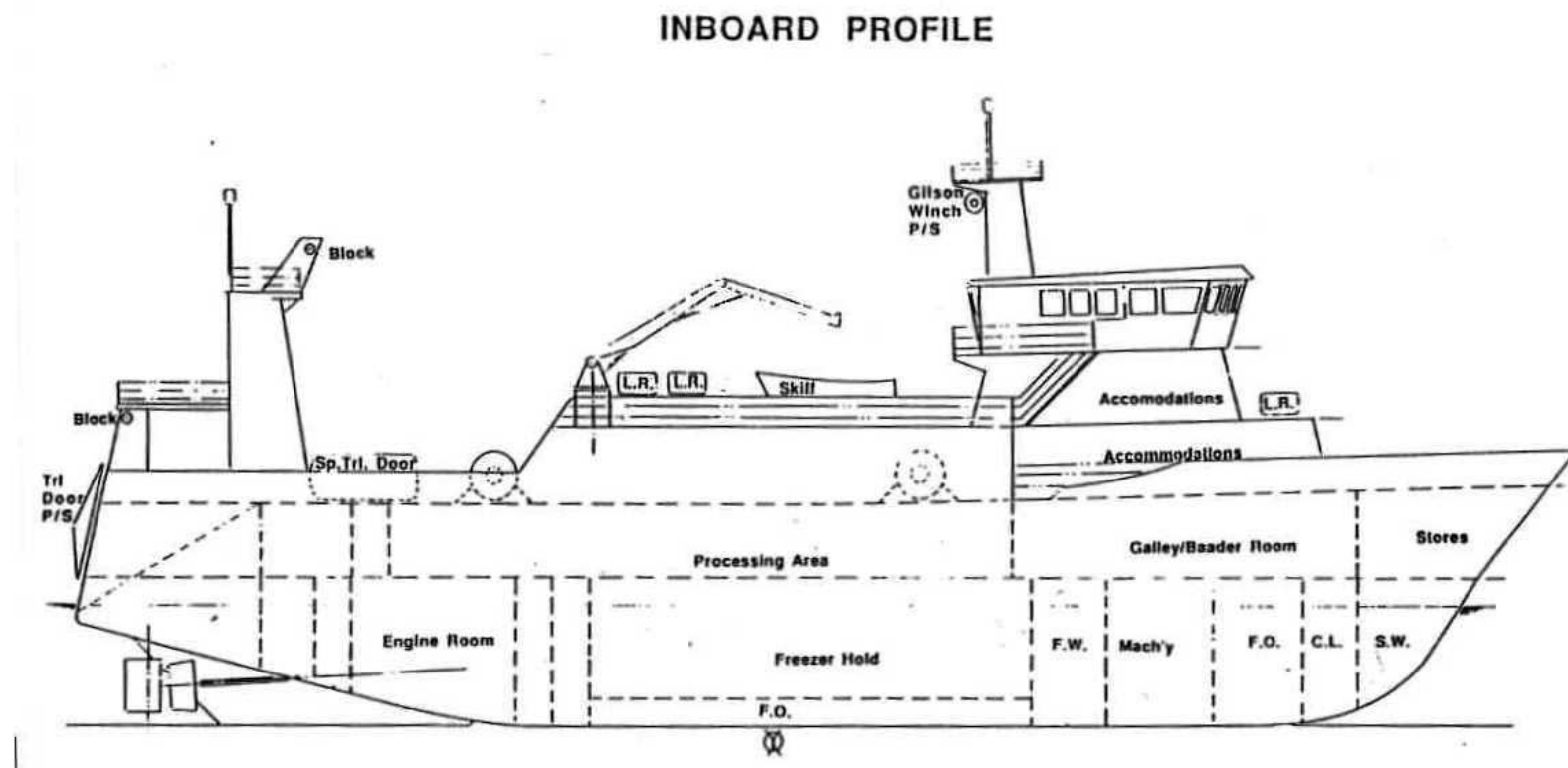
## Summary:

At approx. 1315 on March 22, 1990, the *Aleutian Enterprise* attempted to haul a large catch of fish on board when the net snapped, dropping a large volume of fish on deck and causing the vessel to list to port. The vessel continued to list and water entered the processing deck. Shortly thereafter the vessel capsized and sank.

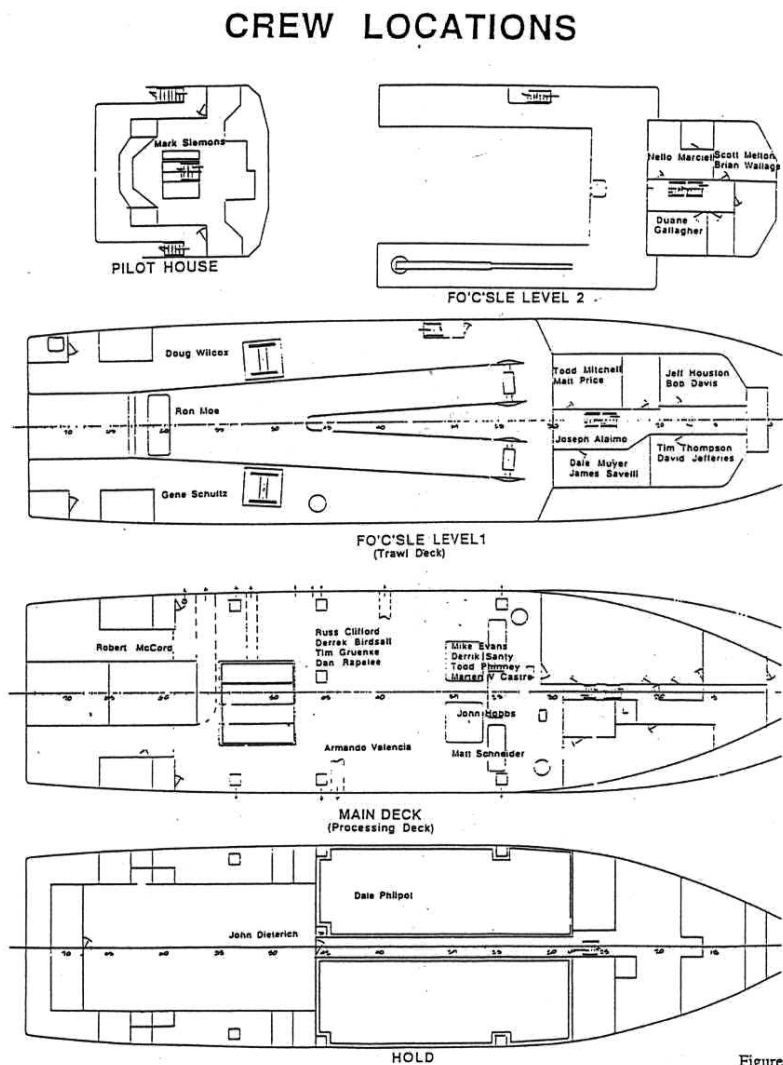
- ❶ Weather clear with 15-20 knot winds, 5-6 ft. seas off starboard bow
- ❷ Nine persons missing at sea & presumed dead

# CASE 1: *Aleutian Enterprise*

## Inboard Profile



# CASE 1: Crew Locations



# CASE 1: Events Leading to Casualty

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- 1300-1315: Haul back ops started
- Due to weight of bag, crew left on both port & starboard hydraulic winches
- Without command from captain, crew hooked up aft winch to help bring up net
- Vessel had 10-15° port list
- Captain continued pulling port & starboard winches -- one reached max capacity

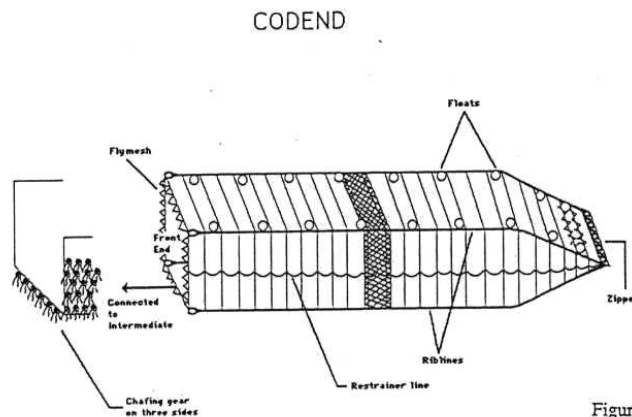
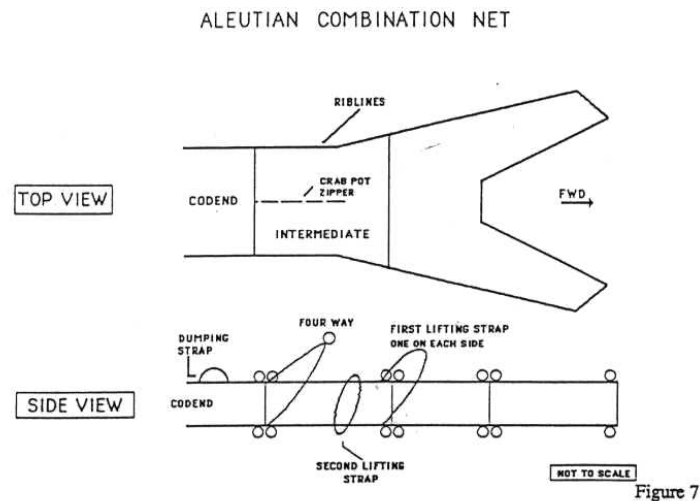


# CASE 1: Events, cont.

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- 1315-1330: Second lifting strap caught on net & ripped intermediate; all fish in int. were dumped on deck (10-15,000 lbs)
- Captain asked crew to open up live tank deck hatch so the fish could go down into the live tank; hatch closed shut before any fish could enter
- Captain lowered starboard winch, shifting the strain of the net and codend to the port winch
- Vessel now listing 15-20°

# CASE 1: Combination Net



# CASE 1: Events, cont.

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- 1330: Captain became concerned at “unusual” list and called nearby vessel, asking it to standby
- Captain did not alert the crew
- Captain used engine room alarm panel to alert chief engineer
- Upon returning to console, captain noticed vessel list had increased to 20-25°

# CASE 1: Events, cont.

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- A deckhand saw fish starting to shift to port, noting: “the codend took a little roll and everything started to go to port, over the rail”
- Captain let out the port, starboard & aft gilsos
- Captain turned auto pilot 45° to port & gave starboard propeller 100% pitch
- Captain activated the general alarm, but it did not sound

# CASE 1: Events, cont.

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- Processors noticed water pouring in chutes
- Sump pump was clogged with fish, debris
- Processors evacuated processing deck
- Crew struggled to find and put on survival suits
- Passageways full of fiber & debris; exit doors blocked
- 1340: *Aleutian Enterprise* capsized and sank

# CASE 1: Findings Related to Skill & Knowledge Limitations

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## CAPTAIN

- Didn't know how to *manage stability of vessel*; continued to haul in heavy net using port net reel and gilson even though vessel was already overloaded with excess equipment and supplies
- Didn't *maintain or provide watertight closures* on six portside hull openings, or provide watertight doors and hatches in four locations, allowing progressive flooding of vessel
- Didn't *provide timely notice to crew of impending danger*
- Didn't *determine operating condition of general alarm* prior to casualty
- Didn't *maintain survival suits*

## CREW

- Didn't know how to *don survival suits*

# CASE 1: Which Forms to Complete?

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## Casualty Screening &

Background Form	-->	Yes
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## Operations Reporting Forms

» bridge	-->	No
» deck	-->	Yes (captain)
» engineering	-->	No
» safety & emergency	-->	Yes (captain, crew)

# **CASE 1: Casualty Screening & Background Form**

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Insert completed form



# CASE 1: Deck Operations Form

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Insert completed form  
for captain

# CASE 1: Deck Operations Findings

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- Captain's skill & knowledge limitations:
  - » *1.1 Load and unload a vessel taking into account load lines, stability, trim, and stress principles & calculations*
  - » *1.3 Operate vessel in compliance with Stability Letter*
  - » *1.4 Ensure vessel's water tight integrity*
  - » *7.2 Bring aboard and load catch*

# **CASE 1: Safety & Emergency Operations Form**

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Insert completed form  
for captain

# CASE 1: Safety & Emergency Operations Findings

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- Captain's skill & knowledge limitations:
  - » *1.3 Inspect and service lifesaving equipment, locating devices, and flotation devices*
  - » *7.1 Establish and maintain communications among crew*
- Crew's knowledge limitation:
  - » *5.1 Don survival suits and personal flotation devices*

# CASE 2: *Yorktown Clipper*

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## Summary:

On August 18, 1993, the 224- ft. passenger vessel *M/V Yorktown Clipper* was southbound in Glacier Bay, Alaska, when the vessel struck an underwater rock. The hull was pierced in several locations, and the vessel began to flood.

- Clear weather, calm seas, moderate wind, 10-mile visibility
- Vessel locating equipment (LORAN, GPS) fully functioning
- Buoys, navigational aids not present in Glacier Bay
- 134 passengers & 42 crew transferred to assisting vessels
- No deaths, injuries, or pollution

# CASE 2: Accident Site

## Glacier Bay, Alaska

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# CASE 2: Events Leading To Casualty

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- 1230 - Second officer relieved master of bridge watch
- 1245 - Began departure from Glacier Bay
- Each hour, second officer entered vessel's position and heading in log
- He did not plot information on the chart
- He navigated by visually observing the vessel's position with respect to its surroundings, and by using radar

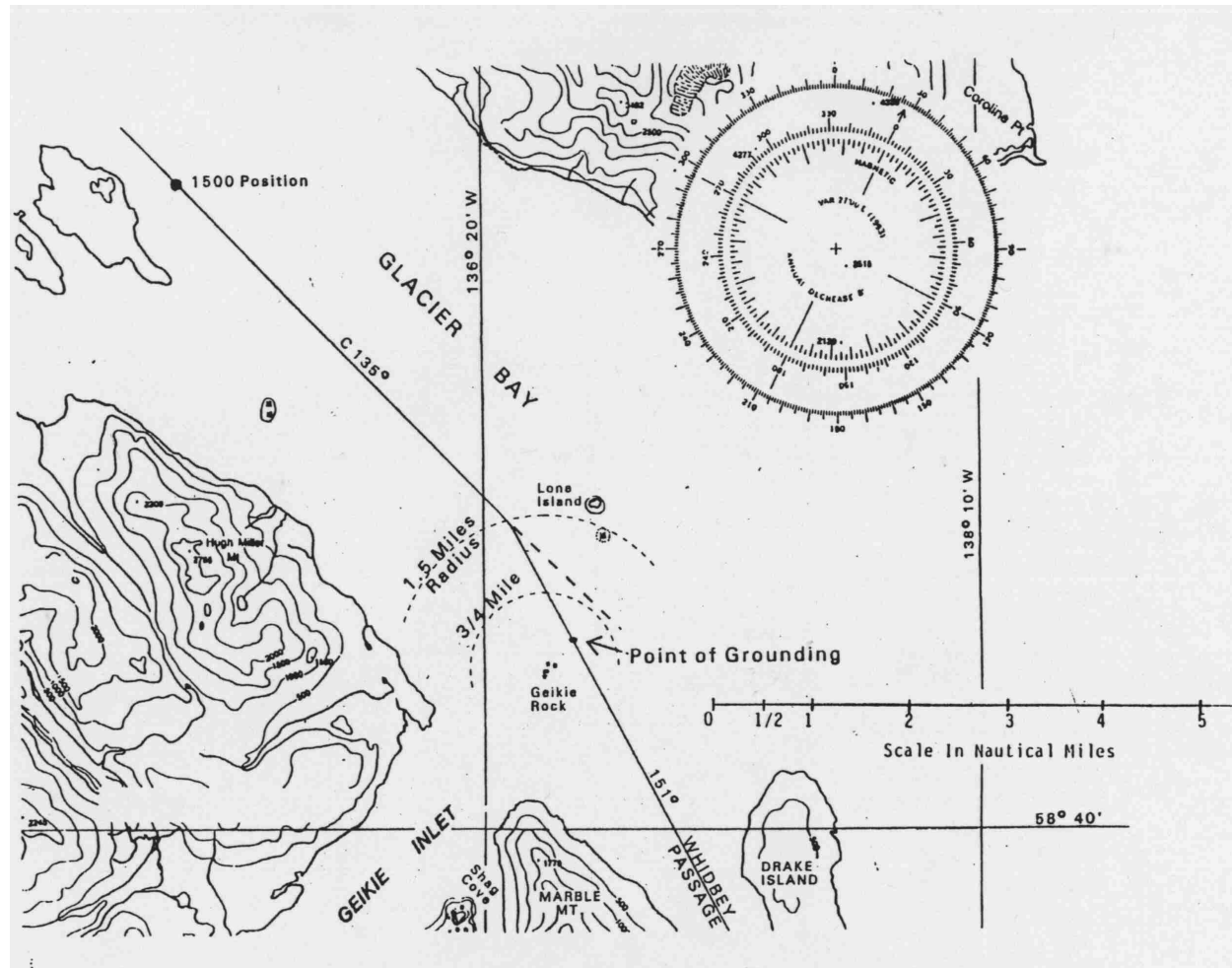
## **CASE 2: Events, cont.**

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- Radar was not stabilized by input from the ship's gyrocompass
- Second officer navigated between Lone Island & Geikie Rock at on course of  $135^{\circ}$
- Starboard radar was on 6-mile scale
- Port radar was on 3-mile scale, with one variable range marker set at  $3/4$  mile, and another set at  $1-1/2$  mile



# CASE 2: Probable Vessel Track Line



## **CASE 2: Events, cont.**

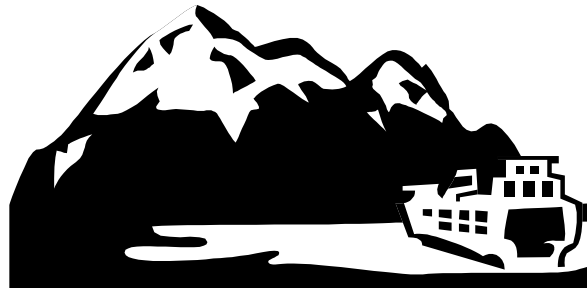
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- Geikie Rock & Lone Island were visible
- Each was surrounded by shallow water covering rocks extending out about .5 mile
- Vessel on autopilot at full speed - 11.3 kn
- Vessel's draft was 8 ft. 4 in.
- 1532 - Vessel struck bottom, hitting a rock 900 yds NE of Geikie Rock
- Captain informed crew & passengers of situation 15 minutes after grounding

# CASE 2: Investigating Skill & Knowledge Limitations

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- Generic
  - » Navigated this vessel before in the same crew position?
  - » Navigated with this master & crew before?
  - » Navigated this passage before?
  - » Is a passage plan regularly used onboard this vessel?



# CASE 2: Investigating Skill & Knowledge Limitations, cont.

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- Specific to *Yorktown Clipper* casualty
  - » What was your passage plan?
  - » Were passage plan & course changes discussed with master prior to watch?
  - » Did you consult the vessel's charts of this area prior to determining your passage plan?
  - » What is the vessel procedure for tracking vessel position?
  - » What kind of GPS does this vessel have?
  - » How did you use the radar to determine the vessel's position?
  - » Where did you set the variable range markers and why?

# **CASE 2: *Yorktown Clipper***

## **Navigational Practices**

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- Watch officers did not plot the vessel's position on the chart
- Entered fix information every hour, using only radar readings
- Did not attempt to project courses on the chart
- Did not show on chart expected times of arrival at the waypoints for course changes and new courses
- If fixes had been plotted, quality would have been suspect
- Radar not used to establish "guard zones"

# CASE 2: Findings Related to Skill & Knowledge Limitations

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## SECOND OFFICER

- Navigational planning and positioning procedures inadequate to identify accurately the vessel's position, or to warn him of the danger of running aground
- Did not make effective use of radar due to inadequate radar observer training



# CASE 2: Which Forms to Complete?

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Casualty Screening & Background Form	-->	Yes
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## Operations Reporting Forms

» bridge	-->	Yes
» deck	-->	No
» engineering	-->	No
» safety & emergency	-->	No

# **CASE 2: Screening & Background Form**

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Insert completed form



# CASE 2 : Bridge Operations Form

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- Need to complete a form for each person whose skill & knowledge limitations contributed to casualty
- Insert side 1 & 2 of form completed for SECOND OFFICER

# CASE 2: Bridge Operations Findings

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## Skill & knowledge limitations:

- » 4.1 - Establish a passage plan based on navigation information and knowledge of area (*captain and 2nd officer*)
- » 4.2 - Determine vessel position by use of available systems (*2nd officer*)
- » 4.3 - Calculate course changes based on navigation information, local conditions, and local regulations (*2nd officer*)

# CASE 3: Fire aboard

## *Scandinavian Star*

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At approx. 2325 on March 15, 1988, a fire occurred in the engine room of the Bahamian flag passenger ship *Scandinavian Star*. Fire started from fuel oil leak spray igniting upon contact with hot exhaust manifold of starboard engine.

- »Ship was 50 mi NE of Cancun en route to Florida
- »Loss of electrical power and malfunction of ship's fixed CO2 fire fighting system hindered efforts to fight fire
- »Inability of crew & passengers to communicate created confusion following casualty
- »Two crewmembers and two passengers injured
- »Damage and repair costs estimated at \$3.5 million

# CASE 3: Known Facts

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## MARCH 14

- 1349 - Ship stopped to repair fuel oil leak in No. 6 cylinder of port engine
- 1421 - Ship back in service, continued voyage to Cozumel

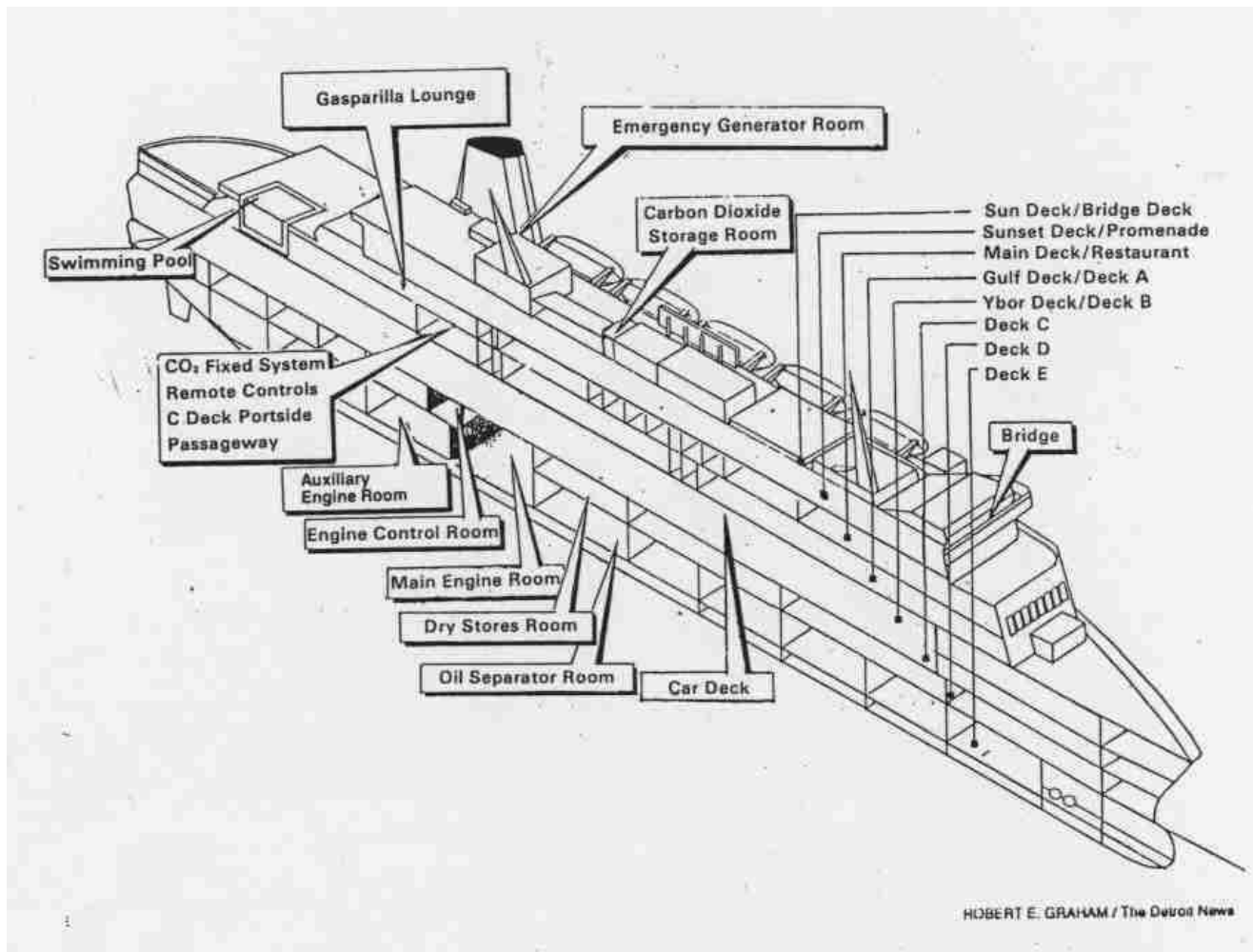
## MARCH 15

- 0900 - Arrived Cozumel
- 1925 - Departed Cozumel
- 2351 - Master broadcast urgent distress message on VHF

## MARCH 16

- 0014 - USCG Miami log notes receipt of distress message

# CASE 3: 3D View of *Scandinavian Star*



# CASE 3: Known Facts, cont.

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MARCH 16

- 0031 - *Scandinavian Star* told USCG Miami, “Ship in no immediate danger at the moment...At present no immediate danger to persons on board...”
- 0214 - Acting as CG on-scene commander, Master of USCG cutter, *Vigilant*, established a communication schedule with *Scandinavian Star*
- 0334 - *Scandinavian Star* requested fire fighting equipment, as fire now no longer in control
- 0428 - CG-1717 dropped fire fighting equipment and life rafts
- 0510 - Fire apparently under control

MARCH 17 - Vessel towed by *Vigilant* into Cancun harbor after spending March 16 at Isla Mujeres Naval Base in Mexico

# CASE 3: Investigation & Reporting Plan

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1. Review known facts
2. Determine what information is still needed to find out what happened and why
3. Assess if 'skill & knowledge limitations' could be an issue
4. Draft questions to pinpoint skill & knowledge limitations (if applicable)
5. Interview all individuals involved (at least once)
6. Review factual information & evidence
7. Complete investigation reporting forms

# CASE 3: Interview Guidelines

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- Who should you interview?
  - » People directly involved in the casualty
  - » People who may know about events leading to casualty while not being involved directly (e.g., safety officer )
- When should the interviews take place?
  - » As soon as possible after the casualty, on site preferably
- Why do the interviews?
  - » To obtain information that is not available on CG2692
  - » To verify facts & get detailed account of events
  - » To review each involved individual's actions or inactions
  - » To identify skill and knowledge limitations (if any), as well as contributing factors



# CASE 3: Potential Persons of Interest

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- Individual listed in CG-2692's "Description of Casualty"
- Individual who committed the last action/decision prior to the casualty
- Individual who was injured
- Individual supervising the injured person
- Individual in charge of vessel activities
- Witnesses or co-workers

# **CASE 3:**

## **Interview Topics**

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1. WHO was involved in casualty?
2. WHAT are the actions or inaction of concern and WHERE did they occur?
3. WHEN did each action or inaction occur?
4. HOW did each action or inaction contribute to the casualty?
5. WHY did the individual act in this way, or why did s/he fail to act?

# **CASE 3: Skill & Knowledge Limitations Interview Topics**

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- » What particular skills or knowledge were required to handle the situation most effectively?
- » Did the individual's decisions, actions or inaction reflect an understanding and use of the skills and knowledge required for the situation?
- » Did the decisions, actions or inaction take place at the appropriate time?
- » To handle the situation effectively, did the individual need more help from another crew member than would normally be necessary?
- » How has the individual performed the required actions in the past?
- » Are there regulations or shipboard procedures governing the activities involved?

# CASE 3: Interview Role Play

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Instructors role play the interview or ask IOs what questions they would ask the *Scandinavian Star's* 2nd engineer

# **CASE 3:**

## **Reconstruction of Events**

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- 2325 - Motorman noticed fuel oil leaking from supply pipe in starboard main engine
- Saw leak develop into a spray which ignited on contact with hot exhaust manifold
- Used hand signals to notify watch engineer
- Engineer signaled to motorman to get portable CO2 extinguisher to fight fire

# **CASE 3:**

## **Reconstruction of Events, cont.**

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- Engineer shut down starboard engine, but not port engine or engine fuel oil booster pump, which feeds both main engines
- Booster pump continued supplying fuel oil to both engines and the fire
- Engineer asked 2nd mate to stop engines, but didn't inform mate of fire at first
- Engineer thought he could put out fire quickly

# **CASE 3:**

## **Reconstruction of Events, cont.**

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- Chief engineer asked 2nd engineer to turn off fuel oil valves, engine room fuel pumps, and ventilation fans
- CO2 was released into engine room, but system failed
- 2nd engineer had to go up 5 decks to manually release CO2 bottles
- Power failed for approx. one hour
- Only water available to fight fire was from swimming pool

# **CASE 3:**

## **Reconstruction of Events, cont.**

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- Public address system inoperable due to power outage
- Passengers notified of casualty by crew members
- Staff captain was in charge of fire fighting
- He didn't ask 2nd engineer what type of fire it was
- Door to main engine room opened & 'reflash' occurred



# CASE 3: Findings Related to Skill & Knowledge Limitations

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- SECOND ENGINEER
  - » Did not shut off engine fuel oil supply
  - » Had he immediately stopped flow of fuel, or instructed the motorman to stop flow of fuel, fire could have been successfully extinguished during initial stages
  - » Did not have adequate theoretical and practical knowledge of the machinery and fuel oil systems
  - » Did not inform the staff captain of the source of the fire
- OTHER CREW
  - » Knowledge of fire fighting inadequate. Crew members not prepared to make proper decisions & take proper actions when fighting fuel oil fire

# CASE 3: Forms to Complete

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Casualty Screening & Background Form

--> Yes

Operations Form

- |                      |     |     |
|----------------------|-----|-----|
| » Bridge             | --> | No  |
| » Deck               | --> | No  |
| » Engineering        | --> | Yes |
| » Safety & Emergency | --> | Yes |

# **CASE 3: Screening & Background Form**

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Include completed screening & background form

# CASE 3: Engineering Form

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Insert completed form, Sides 1 and 2

# **CASE 3: Safety & Emergency Operations Form**

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Insert Sides 1 and 2 of form

# Your Role in the Next Month

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1. Conduct skill & knowledge limitation investigation for vessel casualties & personnel injuries
2. Contact Battelle with input regarding:
  - » data collection forms (format, questions)
  - » investigation and reporting procedures

# What to Include in Your Reporting Package for each Casualty

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- *Casualty Screening & Background* Form
  - Applicable *Operations* Form(s),
  - CG 2692
  - MCIR, MCNS, and MCDD forms
- 
- Collect all casualty reporting packages and send once a month

# How to Contact Us

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- Phone/fax

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